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FLOOD INSURANCE STUDY

ORIGINAL

TOWNSHIP OF EAST GREENWICH, NEW JERSEY
GLOUCESTER COUNTY

JUNE 1, 1982

Federal Emergency Management Agency

COMMUNITY NUMBER - 340200

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PUBLISHED SEPARATELY:

Flood Insurance Rate Map Index

Flood Insurance Rate Map

FLOOD INSURANCE STUDY
TOWNSHIP OF EAST GREENWICH, NEW JERSEY

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study investigates the existence and severity of flood hazards in the Township of East Greenwich, Gloucester County, New Jersey, and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study will be used to convert East Greenwich to the regular program of flood insurance by the Federal Emergency Management Agency (FEMA). Local and regional planners will use this study in their efforts to promote sound flood plain management.

In some states or communities, flood plain management criteria or regulations may exist that are more restrictive or comprehensive than those on which these federally-supported studies are based. These criteria take precedence over the minimum federal criteria for purposes of regulating development in the flood plain, as set forth in the Code of Federal Regulations at 44 CFR, 60.3. In such cases, however, it shall be understood that the state (or other jurisdictional agency) shall be able to explain these requirements and criteria.

1.2 Authority and Acknowledgements

The source of authority for this Flood Insurance Study is the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses for this study were prepared by URS Company, Inc. for the Federal Emergency Management Agency, under contract No. H-4808. This work was completed in February 1981.

1.3 Coordination

Streams requiring detailed study were identified at an initial Consultation and Coordination Officer's (CCO) meeting held on May 16, 1978. This meeting was attended by representatives of the FEMA, URS, Inc. (the study contractor) and the Township of East Greenwich.

A search for basic data was made at all levels of government, including local officials. In November 1978, a letter was submitted to the mayor and town engineer requesting any available information related to topo-

graphic data, past flooding problems, local flood protection improvements and township history which the township would like to incorporate into the study.

An intermediate CCO meeting was held on February 17, 1981, attended by the State of New Jersey Division of Water Resources, URS, Inc. and local officials. Preliminary delineations were reviewed and commented upon at this meeting.

On January 6, 1982, the results of this study were reviewed at the final CCO Meeting attended by representatives of the FEMA, the study contractor and community officials.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the incorporated area of the Township of East Greenwich, Gloucester County, New Jersey. The area of study is shown on the Vicinity Map (Figure 1).

Mantua Creek was studied by detailed methods for its entire length within the township. Edwards Run was studied by detailed methods from its confluence with Mantua Creek to a point approximately 760 feet south of the New Jersey Turnpike bridge. Although the Delaware River is not located adjacent to the township, the area is subject to inundation from tidal elevations generated in the Delaware Bay and River. Therefore, a detailed analysis of the tidal elevations is presented in this study. The areas studied y detailed methods were selected with priority given to all known flood hazard areas and areas of projected development and proposed construction for the next five years, through February 1986.

All or portions of the following streams were studied by approximate methods. Edwards Run, Rattling Run, Still Run, London Branch, Pargey Creek, and Nehonsey Brook. Approximate methods of analysis were used to study those areas having low development potential and minimal flood hazards as identified at the initiation of the study. The scope and methods of study were proposed to and agreed upon by the FEMA.

2.2 Community Description

The Township of East Greenwich is located in Gloucester County, New Jersey, approximately 12 miles southwest of Camden, New Jersey. The township is bordered on the north by the Township of Greenwich and the Borough of Paulsboro, on the east by the Township of West Deptford, on the south by the Townships of Mantua and Harrison, and on the west by the

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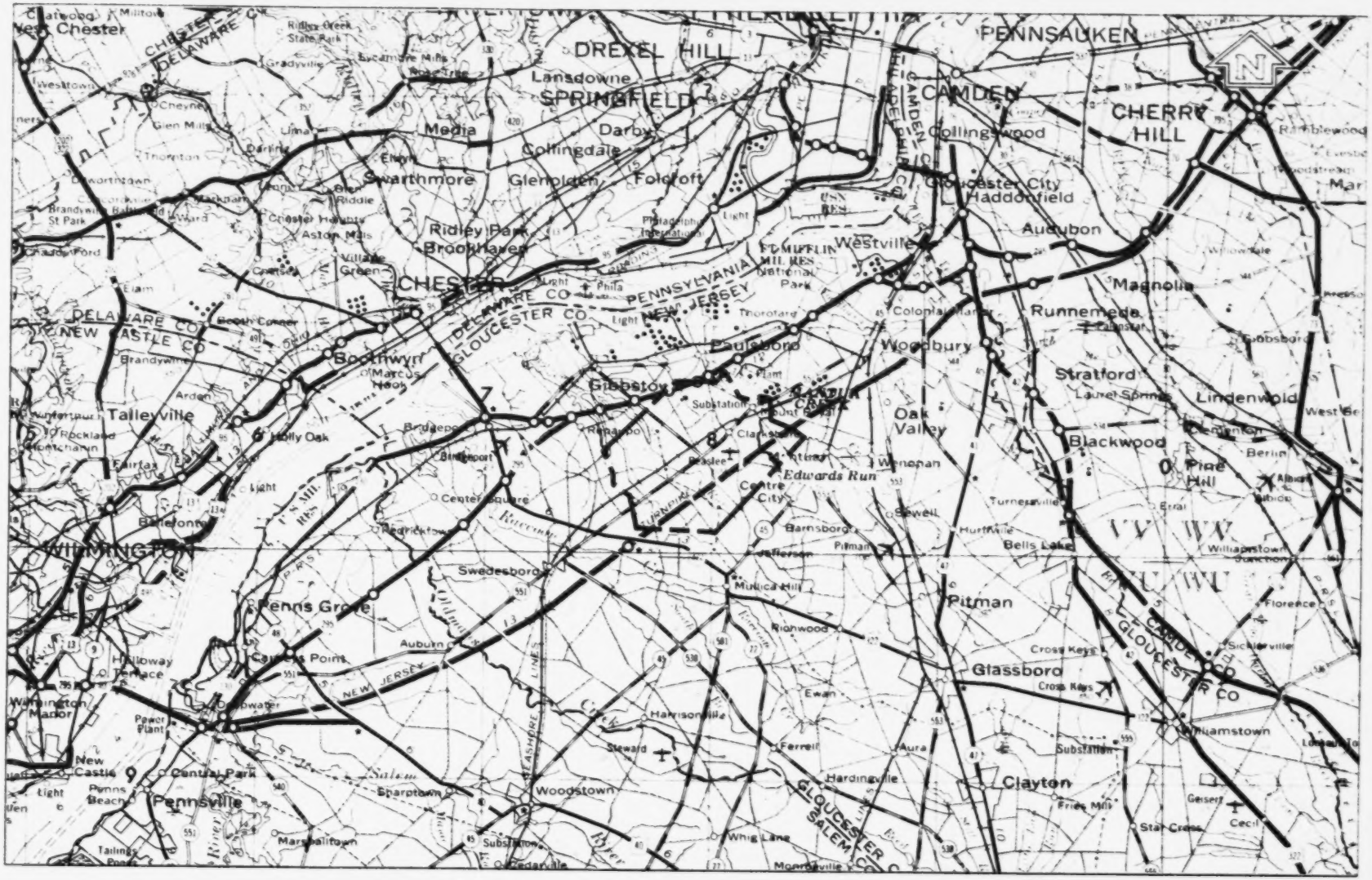

FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWNSHIP OF EAST GREENWICH, NJ
(GLOUCESTER CO.)

APPROXIMATE SCALE

4 0 4 8 12 MILES

VICINITY MAP

Township of Woolwich. The township covers 14.9 square miles, and the major communities include Clarksboro, Mickleton, and Mount Royal. Clarksboro began in March 1779, and the centerpiece was the County Poor House. Mickleton grew up around a Friends Meeting House built in 1740, and Mount Royal was a stop along the Mail Stage Road from Philadelphia to Salem.

East Greenwich has an estimated 1977 population of 3,633 persons (Reference 1). The township is higher than the surrounding swamp and marsh areas of some of the neighboring municipalities, and consists of fine farms and small residential communities. Numerous streams provide drainage throughout the township. Mantua Creek and its tributary, Edwards Run, drains the eastern half of the township. The rest of the township is drained by Pargey Creek, Rattling Run, Still Run and Nehonsey Brook, which all have their headwaters in the township.

The Township of East Greenwich is located in the inner plain of the Atlantic Coastal Plain physiographic province. This inner plain is separated from the remainder of the coastal plain by a cuesta (ridge) which extends from Atlantic Highlands, New Jersey, through Beacon Hill to Mullica Hill in the neighboring Township of Harrison. The inner plain is the lowland north and west of the cuesta's steep slope with drainage to the Delaware River, and the outer plain is the cuesta's very gentle other slope with drainage to the Atlantic Ocean or the Delaware Bay. Both parts of the coastal plain share similar traits such as unconsolidated clays, sands, marls and gravels, but there is a greater proportion of clays in the sediments of the inner coastal plain. The coastal plain is geologically the youngest, softest, and least resistant to erosion, and topographically the flattest and lowest area in the state.

The inner coastal plain is part of an area of high population density and urban development. The extent of growth in the region will depend on the development of transportation routes and additional crossings of the Delaware River and Bay.

Annual precipitation in this area is approximately 42 inches per year. The area has a temperate climate with an annual average temperature of 55 degrees Fahrenheit (°F).

2.3 Principal Flood Problems

Historically, the community of Mount Royal has been subject to the worst flooding within the township. During the flood of September 1940, five dwellings were swept away and 20 other bungalows were flooded to their eaves. This flood was estimated to have a recurrence interval of over 500 years. County-wide during this flood, there were numerous lake dam failures, 15 major road and bridge washouts, and several deaths.

Today, only a few dwellings are within the flood plain of Mantua Creek and Edwards Run. These are located off of North Street and adjacent to the Kings Highway bridge over Mantua Creek.

2.4 Flood Protection Measures

There are no existing or proposed flood control or related measures in the Township of East Greenwich, or upstream in the watershed.

3.0 ENGINEERING METHODS

For the flooding sources studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data for this study. Flood events of a magnitude which are expected to be equalled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for flood plain management and for flood insurance premium rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10-, 2-, 1-, and 0.2-percent chance, respectively, of being equalled or exceeded during any year. Although the recurrence interval represents the long-term average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than one year are considered. For example, the risk of having a flood which equals or exceeds the 100-year flood (one-percent chance of annual occurrence) in any 50-year period is about 40 percent (four in ten) and, for any 90-year period, the risk increases to about 60 percent (six in ten). The analyses reported here reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency and peak elevation-frequency relationships for floods of the selected recurrence intervals for each flooding source studied in detail affecting the community.

The hydrologic analysis of the Delaware River used in the Flood Insurance Study of the City of Philadelphia, Pennsylvania, was adopted for this study (Reference 2). In that study, elevation-frequency relationships for the Delaware River were prepared by the Philadelphia District of the U. S. Army Corps of Engineers (COE) (Reference 3). Tidal elevations were interpolated from the frequency curves for the 10-, 50-, 100- and 500-year floods at the mouths of Poquessing, Pennypack, Tacony, Frankford and Darby Creeks, and the Schuylkill River.

For Manutua Creek, peak discharges for the 10-, 50-, 100- and 500-year recurrence intervals were developed using a weighted average of Special Report 38 discharges and log-Pearson Type III discharges from the Pitman, New Jersey gage located along Mantua Creek (No. 01475000) (References 4 and 5).

Special Report 38 is based on a regression analysis of 103 gages in New Jersey and is used to estimate peak-flood magnitudes having selected recurrence intervals for drainage basins larger than 1.0 square mile with various degrees of urban or suburban development. Parameters used in this method are basin size, channel slope, surface storage and population density. Gage values were transposed using the drainage area proportioning formula $Q_1Q_2 = (A_1/A_2)^{0.75}$, where Q_1 and Q_2 are the discharges at the transposed point and at the gage, respectively, and A_1 and A_2 are the drainage areas at the transposed point and at the gage, respectively (Reference 6). The weighting formula used was:

$$\log Q = [N_1(\log Q_1) + N_r(\log Q_r)] \; / \; N_1 + N_r$$

Where:

N_1 = Years of record for gage discharges
N_r = Equivalent years of record for Special Report 38
Q_1 = Transposed gage discharge
Q_r = Special Report 38 discharge

For Edwards Run, peak discharges for the 10-, 50-, 100- and 500-year recurrence intervals were developed using drainage area proportioning employing discharges calculated for Mantua Creek at two locations. The choice of which location to utilize was dependent upon the slope of the stream.

A summary of drainage area-peak discharge relationships for Mantua Creek and Edwards Run is shown in Table 1, "Summary of Discharges". A summary of elevations for the Delaware River is shown in Table 2, "Summary of Elevations".

TABLE 1 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
MANTUA CREEK					
Upstream of Interstate Route 295	47.2	2,000	5,065	7,215	16,000
Upstream of Conrail	44.8	1,980	5,110	7,315	16,175
Upstream of confluence of Edwards Run	33.5	1,595	4,095	5,870	12,990

TABLE 1 - SUMMARY OF DISCHARGES - continued

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
MANTUA CREEK (continued)					
Upstream of the New Jersey Turnpike	33.1	1,580	4,070	5,830	12,905
EDWARDS RUN					
At the confluence with Mantua Creek	10.1	645	1,670	2,390	5,290
Upstream of Berkley Road	10.0	640	1,655	2,370	5,240
At a point 760 feet south of the New Jersey Turnpike bridge	8.8	580	1,500	2,150	4,755

TABLE 2 - SUMMARY OF ELEVATIONS

FLOODING SOURCE AND LOCATION	ELEVATION (feet) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
DELAWARE RIVER				
At the confluence of Mantua Creek	7.6	8.9	9.8	14.4

The storm surge elevations for the 10-, 50-, 100- and 500-year floods have been determined for the Delaware River. The analyses reported herein reflect the stillwater elevations due to tidal and wind set-up effects, but do not include the contributions from wave action effects such as the wave crest height and wave runup. Nonetheless, this additional hazard due to wave action effects should be considered in the planning of future development.

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of the flooding sources studied in detail were carried out to provide estimates of the elevations of floods of the selected recurrence intervals along each of these flooding sources.

For Mantua Creek and Edwards Run, channel cross sections and partial overbank cross sections were obtained through field surveys. The overbanks were extended using topographic maps compiled from aerial photographs at a scale of 1:2,400 (Reference 7). All bridges and culverts were field surveyed to obtain elevation data and structural geometry.

Channel roughness factors (Manning's "n") used in the hydraulic computations were assigned on the basis of field inspection of various cross sections in the flood plain areas. For Mantua Creek, the main channel value was 0.028 and the overbank values ranged from 0.06 to 0.08. For Edwards Run the main channel value was 0.028 and the overbank values ranged from 0.06 to 0.10.

Water-surface profiles were developed using the COE HEC-2 computer step-backwater computer program (Reference 8). Cross section were located at close intervals above and below bridges and culverts in order to compute the significant backwater effects of those structures. Starting water-surface elevations for Mantua Creek were taken directly from the Flood Insurance Study for the Borough of Paulsboro, which based starting water-surface elevations on the 1-year tide of the Delaware River (Reference 9). Starting water-surface elevations for Edwards Run were calculated using the slope/area method.

Flood profiles were drawn showing computed water-surface elevations to an accuracy of 0.5 foot for floods of the selected recurrence intervals. Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles (Exhibit 1). For stream segments for which a floodway is computed (Section 4.2), selected cross-section locations are also shown on the Flood Boundary and Floodway Map (Exhibit 3).

All elevations used in this study are referenced to the National Geodetic Vertical Datum of 1929 (NGVD), formerly referred to as Sea Level Datum of 1929. Locations of the elevation reference marks used in the study are shown on the maps.

The hydraulic analyses for this study are based on the effects of unobstructed flow. The flood elevations shown on the profiles are valid only if hydraulic structures remain unobstructed and do not fail.

4.0 FLOOD PLAIN MANAGEMENT APPLICATIONS

The National Flood Insurance Program encourages state and local governments to adopt sound flood plain management programs. Therefore, each Flood Insurance Study includes a flood boundary map designed to assist communities in developing sound flood plain management measures.

4.1 Flood Boundaries

In order to provide a national standard without regional discrimination, the 100-year flood has been adopted by the FEMA as the base flood for purposes of flood plain management measures. The 500-year flood is employed to indicate additional areas of flood risk in the community. For each stream studied in detail, the boundaries of the 100- and 500-year floods have been delineated using the flood elevations determined at each cross

section; between cross sections, the boundaries were interpolated using topographic maps compiled from aerial photographs at a scale of 1:2,400, with a contour interval of 5 feet (Reference 7). In cases where the 100- and 500-year flood boundaries are close together, only the 100-year boundary has been shown.

The boundaries of the 100- and 500-year floods are shown on the Flood Boundary and Floodway Map (Exhibit 3). Small areas within the flood boundaries may lie above the flood elevations and, therefore, may not be subject to flooding. Owing to limitations of the map scale and lack of detailed topographic data, such areas are not shown.

For the areas studied by approximate methods the boundaries of the 100-year flood were taken directly from the Flood Hazard Boundary Map for the Township of East Greenwich (Reference 10).

4.2 Floodways

Encroachment on flood plains, such as artificial fill, reduces the flood-carrying capacity, increases the flood heights of streams, and increases flood hazards in areas beyond the encroachment itself. One aspect of flood plain management involves balancing the economic gain from flood plain development against the resulting increase in flood hazard. For purposes of the Flood Insurance Program, the concept of a floodway is used as a tool to assist local communities in this aspect of flood plain management. Under this concept, the area of the 100-year flood is divided into a floodway and a floodway fringe. The floodway is the channel of a stream plus any adjacent flood plain areas that must be kept free of encroachment in order that the 100-year flood can be carried without substantial increases in flood heights. Minimum standards of the FEMA limit such increases in flood heights to 1.0 foot, provided that hazardous velocities are not produced. However, the State of New Jersey has established criteria limiting the increase in flood heights to 0.2 foot. Thus, floodways having no more than a 0.2-foot surcharge have been delineated for this study. The floodways in this report are presented to local agencies as minimum standards that can be adopted or that can be used as a basis for additional studies.

The floodways presented in this study were computed on the basis of equal conveyance reduction from each side of the flood plains. The results of these computations are tabulated at selected cross sections for each stream segment for which a floodway is computed (Table 3). Portions of the floodway widths for Mantua Creek extend beyond the corporate limits of the Township of East Greenwich.

As shown on the Flood Boundary and Floodway Map (Exhibit 3), the floodway widths were determined at cross sections; between cross sections, the boundaries were interpolated. In cases where the boundaries of the flood-

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Mantua Creek								
A	2,440[1]	140/45[3]	933	7.7	9.8	-0.3[5]	-0.2	0.1
B	4,820[1]	140/95[3]	1,241	5.8	9.8	2.5[5]	2.6	0.1
C	7,090[1]	221/61[3]	1,499	4.8	9.8	4.2[5]	4.3	0.1
D	10,685[1]	135/70[3]	1,336	5.4	9.8	5.9[5]	6.1	0.2
E	14,890[1]	368/43[3]	2,988	2.0	9.8	8.2[5]	8.4	0.2
F	17,110[1]	362/232[3]	3,244	1.8	9.8	8.5[5]	8.7	0.2
G	17,820[1]	353/288[3]	3,132	1.9	9.8	8.6[5]	8.8	0.2
H	19,670[1]	342/267[3]	3,057	1.9	10.2[4]	9.1[5]	9.3	0.2
Edwards Run								
A	210[2]	67	382	6.3	9.8	1.6[5]	1.8	0.2
B	1,050[2]	75	405	5.9	9.8	3.0[5]	3.1	0.1
C	3,040[2]	321	1,337	1.8	9.8	6.1[5]	6.3	0.2
D	4,270[2]	390	1,348	1.8	9.8	6.6[5]	6.8	0.2
E	6,900[2]	286	1,065	2.2	9.8	8.1[5]	8.2	0.1
F	7,840[2]	200	1,078	2.2	10.8[4]	10.8[5]	10.8	0.0

[1]Feet above corporate limits
[2]Feet above confluence with Mantua Creek
[3]Width/width within corporate limits
[4]Elevation computed without consideration of 1-year tide elevation or backwater effects from the Delaware River
[5]Elevation computed based on starting water-surface elevation of 1-year tide

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWNSHIP OF EAST GREENWICH, NJ

(GLOUCESTER CO.)

FLOODWAY DATA

MANTUA CREEK AND EDWARDS RUN

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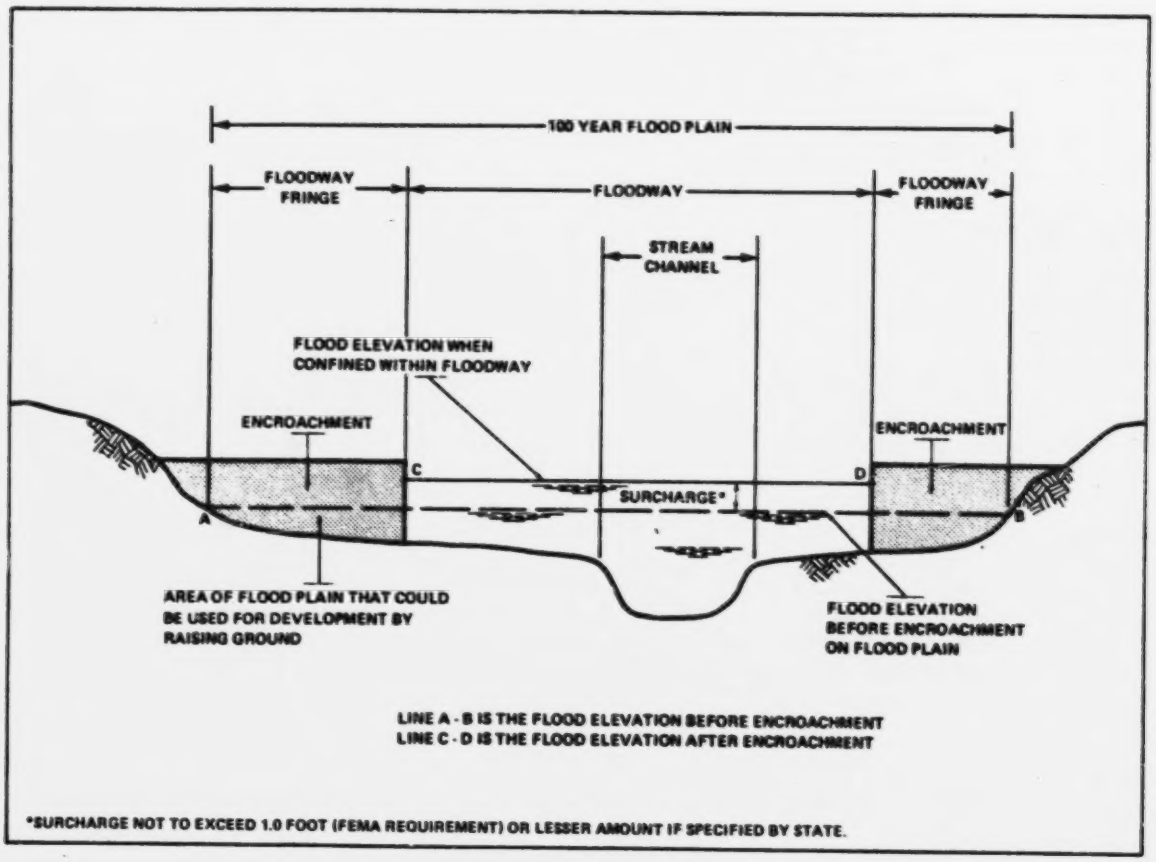
way and the 100-year flood are either close together or collinear, only the floodway boundary has been shown.

The area between the floodway and the boundary of the 100-year flood is termed the floodway fringe. The floodway fringe thus encompasses the portion of the flood plain that could be completely obstructed without increasing the water-surface elevation of the 100-year flood by more than 0.2 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to flood plain development are shown in Figure 2.


100 YEAR FLOOD PLAIN
FLOODWAY FRINGE
FLOODWAY
FLOODWAY FRINGE
STREAM CHANNEL
FLOOD ELEVATION WHEN CONFINED WITHIN FLOODWAY
ENCROACHMENT
ENCROACHMENT
C
D
SURCHARGE*
A
B
AREA OF FLOOD PLAIN THAT COULD BE USED FOR DEVELOPMENT BY RAISING GROUND
FLOOD ELEVATION BEFORE ENCROACHMENT ON FLOOD PLAIN
LINE A - B IS THE FLOOD ELEVATION BEFORE ENCROACHMENT
LINE C - D IS THE FLOOD ELEVATION AFTER ENCROACHMENT
*SURCHARGE NOT TO EXCEED 1.0 FOOT (FEMA REQUIREMENT) OR LESSER AMOUNT IF SPECIFIED BY STATE.

FLOODWAY SCHEMATIC

Figure 2

Near the mouths of streams studied in detail, floodway computations are made without regard to flood elevations on the receiving water body. The floodways for Mantua Creek and Edwards Run were based solely on fluvial flow and therefore the starting condition for this calculation was normal depth as determined by the slope/area method. Therefore, "With Floodway" elevations presented in Table 3 for certain downstream cross sections of

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Mantua Creek and Edwards Run are lower than the regulatory flood elevations in that area, which must take into account the 100-year flooding due to backwater from other sources.

5.0 INSURANCE APPLICATION

In order to establish actuarial insurance rates, the FEMA has developed a process to transform the data from the engineering study into flood insurance criteria. This process includes the determination of reaches, Flood Hazard Factors (FHFs), and flood insurance zone designations for each flooding source affecting the Township of East Greenwich.

5.1 Reach Determinations

Reaches are defined as lengths of watercourses having relatively the same flood hazard, based on the average weighted difference in water-surface elevations between the 10- and 100-year floods. This difference does not have a variation greater than that indicated in the following table for more than 20 percent of the reach.

Average Difference Between 10- and 100-Year Floods	Variation
Less than 2 feet	0.5 foot
2 to 7 feet	1.0 foot
7.1 to 12 feet	2.0 feet
More than 12 feet	3.0 feet

The locations of the reaches determined for Mantua Creek and Edwards Run in the Township of East Greenwich are shown on the Flood Profiles (Exhibit 1) and are summarized in the Flood Insurance Zone Data Table (Table 4).

5.2 Flood Hazard Factors

The FHF is the FEMA device used to correlate flood information with insurance rate tables. Correlations between property damage from floods and their FHFs are used to set actuarial insurance premium rate tables based on FHFs from 005 to 200.

The FHF for a reach is the average weighted difference between the 10- and 100-year flood water-surface elevations expressed to the nearest 0.5 foot, and shown as a three-digit code. For example, if the difference between water-surface elevations of the 10- and 100-year floods is 0.7 foot, the FHF is 005; if the difference is 1.4 feet, the FHF is 015; if the difference is 5.0 feet, the FHF is 050. When the difference between the 10- and 100-year water-surface elevations is greater than 10.0 feet, accuracy for the FHF is to the nearest foot.

FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1.0% (100-YEAR) FLOOD AND			FHF	ZONE	BASE FLOOD ELEVATION[3] (NGVD)
		10% (10 YR.)	2% (50 YR.)	0.2% (500 YR.)			
Delaware River (Backwater affecting Mantua Creek and Edwards Run)	02,05	-2.2	-0.9	+4.6	020	A4	10
Mantua Creek Reach 1	02	-2.9	-1.5	+6.5	030	A6	Varies
Edwards Run Reach 1	05	-3.0	-1.4	+4.0	030	A6	Varies

[1]Flood Insurance Rate Map Panel
[2]Weighted Average
[3]Rounded to the nearest foot - see map

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWNSHIP OF EAST GREENWICH, NJ
(GLOUCESTER CO.)

FLOOD INSURANCE ZONE DATA

DELAWARE RIVER, MANTUA CREEK AND EDWARDS RUN

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5.3 Flood Insurance Zones

After the determination of reaches and their respective FHFs, the entire incorporated area of the Township of East Greenwich was divided into zones, each having a specific flood potential or hazard. Each zone was assigned one of the following flood insurance zone designations:

Zone A	Special Flood Hazard Areas inundated by the 100-year flood, determined by approximate methods; no base flood elevations shown of FHFs determined.
Zones A4 and A6:	Special Flood Hazard Areas inundated by the 100-year flood, determined by detailed methods; base flood elevations shown, and zones subdivided according to FHF.
Zone B:	Areas between the Special Flood Hazard Area and the limits of the 500-year flood, including areas of the 500-year flood plain that are protected from the 100-year flood by dike, levee, or other water control structure; also, areas subject to certain types of 100-year shallow flooding where depths are less than 1.0 foot; and areas subject to 100-year flooding from sources with drainage areas less than 1 square mile. Zone B is not subdivided.
Zone C:	Areas of minimal flooding.

Table 4, "Flood Insurance Zone Data," summarizes the flood elevation differences, FHFs, flood insurance zones, and base flood elevations for the flooding sources studied in detail in the Township of East Greenwich.

5.4 Flood Insurance Rate Map Description

The Flood Insurance Rate Map for the Township of East Greenwich is, for insurance purposes, the principal result of the Flood Insurance Study. This map (published separately) contains the official delineation of flood insurance zones and base flood elevation lines. Base flood elevation lines show the locations of the expected whole-foot water-surface elevations of the base (100-year) flood. This map is developed in accordance with the latest flood insurance map preparation guidelines published by the FEMA.

6.0 OTHER STUDIES

Flood Insurance Studies are currently being prepared for the adjacent Townships of Greenwich, West Deptford, Mantua, Harrison, and Woolwich, and the

Borough of National Park (References 11, 12 13, 14, 15, and 16). The results of these studies will be in exact agreement with the results of this study.

The Philadelphia District of the COE has completed two studies of the Mantua Creek basin. Because of hydrology revisions, however, they were not utilized in this study (References 17 and 18).

This study is authoritative for purposes of the Flood Insurance Program, and the data presented here either supersede or are compatible with previous determinations.

7.0 LOCATION OF DATA

Survey, hydrologic, hydraulic, and other pertinent data used in this study can be obtained by contacting the office of the Insurance and Mitigation Division of the Federal Emergency Management Agency, Regional Director, Region II Office, 26 Federal Plaza, Room 19-100, New York, New York 10278.

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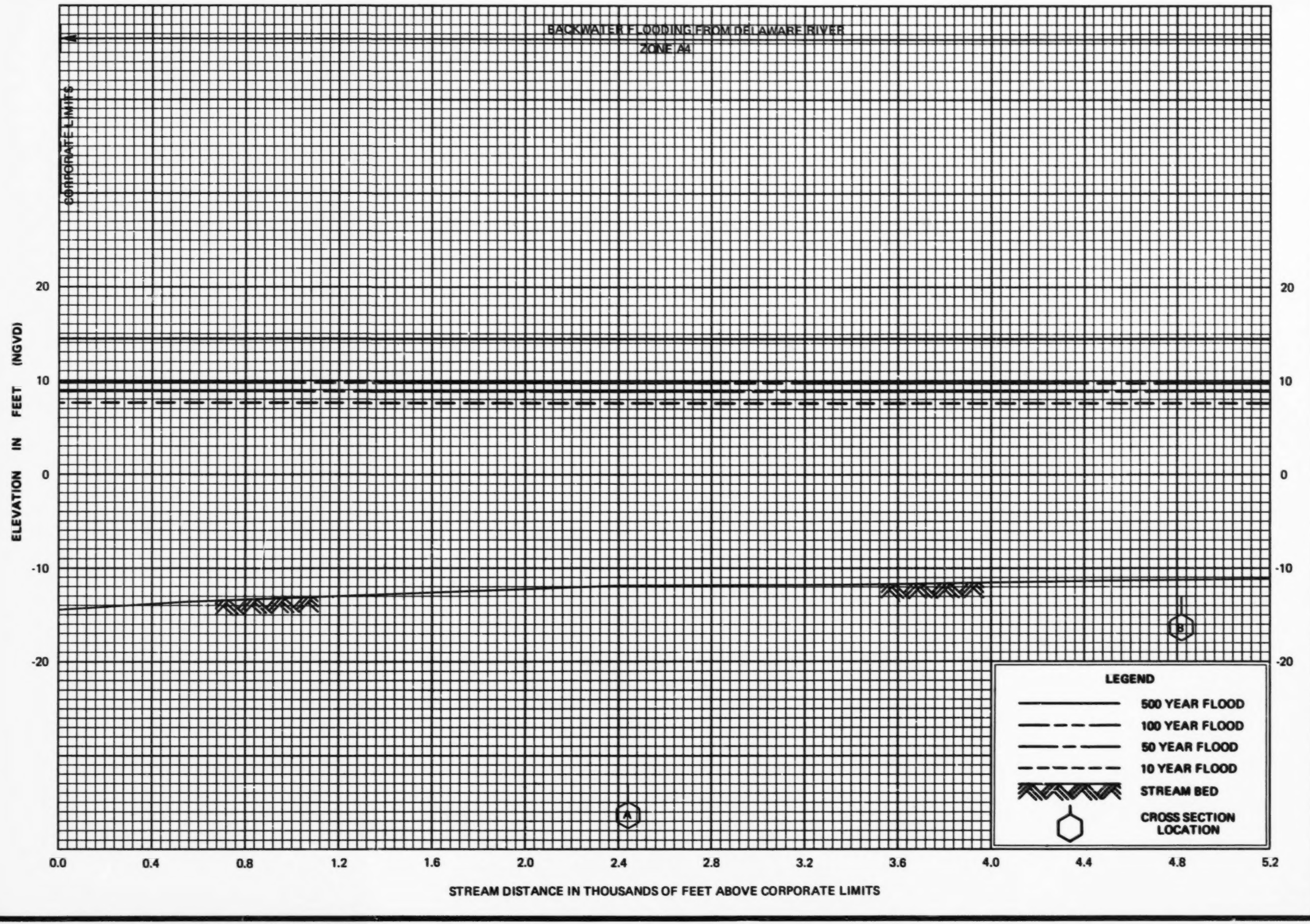

FLOOD PROFILES

MANTUA CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWNSHIP OF EAST GREENWICH, NJ
(GLOUCESTER CO.)

01P

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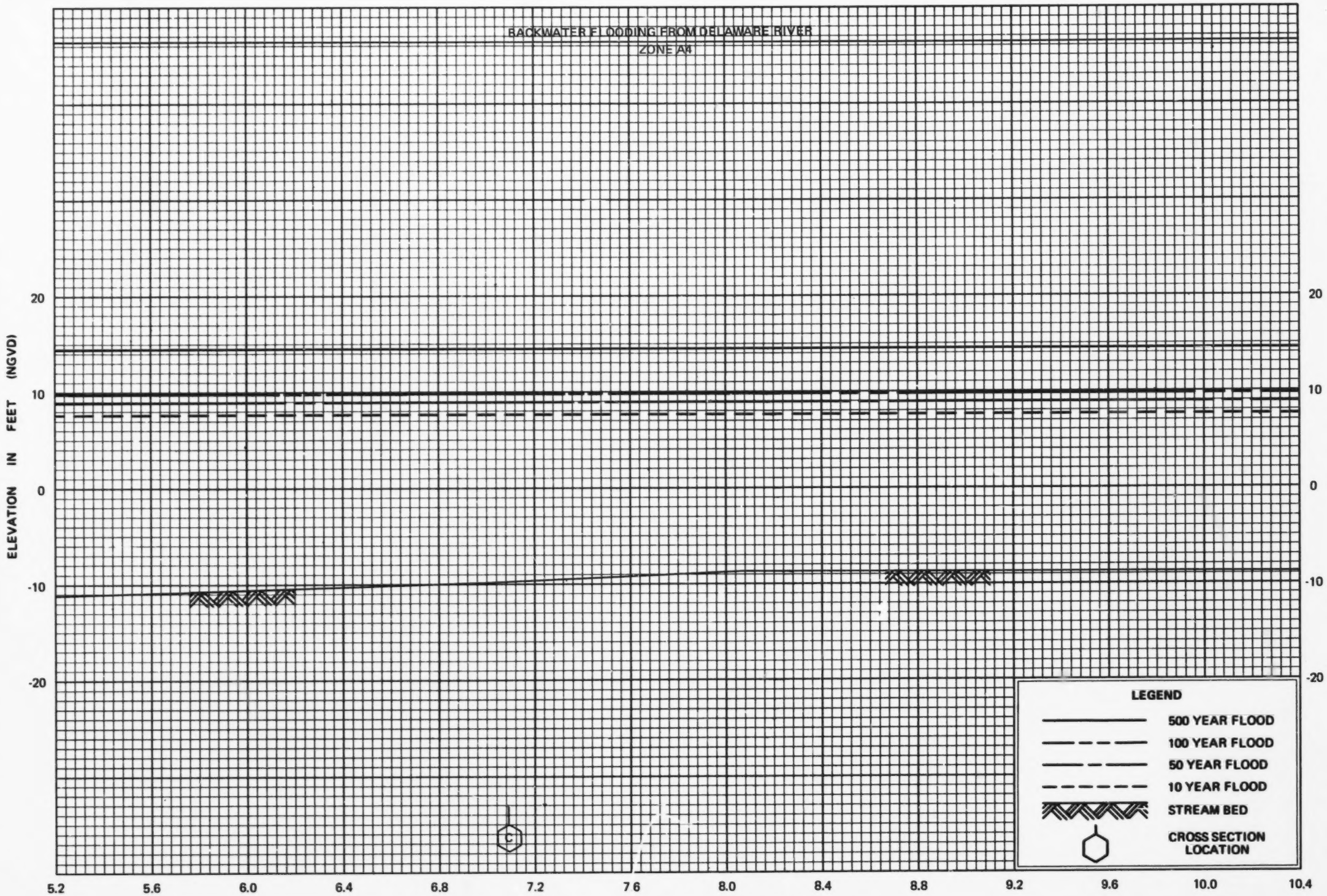

FLOOD PROFILES

MANTUA CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWNSHIP OF EAST GREENWICH, NJ
(GLOUCESTER CO.)

02P

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BACKWATER FLOODING FROM DELAWARE RIVER

ZONE A4

KINGS HIGHWAY

CONRAIL

CONFLUENCE OF EDWARDS RUN

ELEVATION IN FEET (NGVD)

30
20
10
0
-10
-20

10.4 10.8 11.2 11.6 12.0 12.4 12.8 13.2 13.6 14.0 14.4 14.8 15.2 15.6

STREAM DISTANCE IN THOUSANDS OF FEET ABOVE CORPORATE LIMITS

LEGEND

- 500 YEAR FLOOD
- 100 YEAR FLOOD
- 50 YEAR FLOOD
- 10 YEAR FLOOD
- STREAM BED
- CROSS SECTION LOCATION

FLOOD PROFILES

MANTUA CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWNSHIP OF EAST GREENWICH, NJ
(GLOUCESTER CO.)

03P

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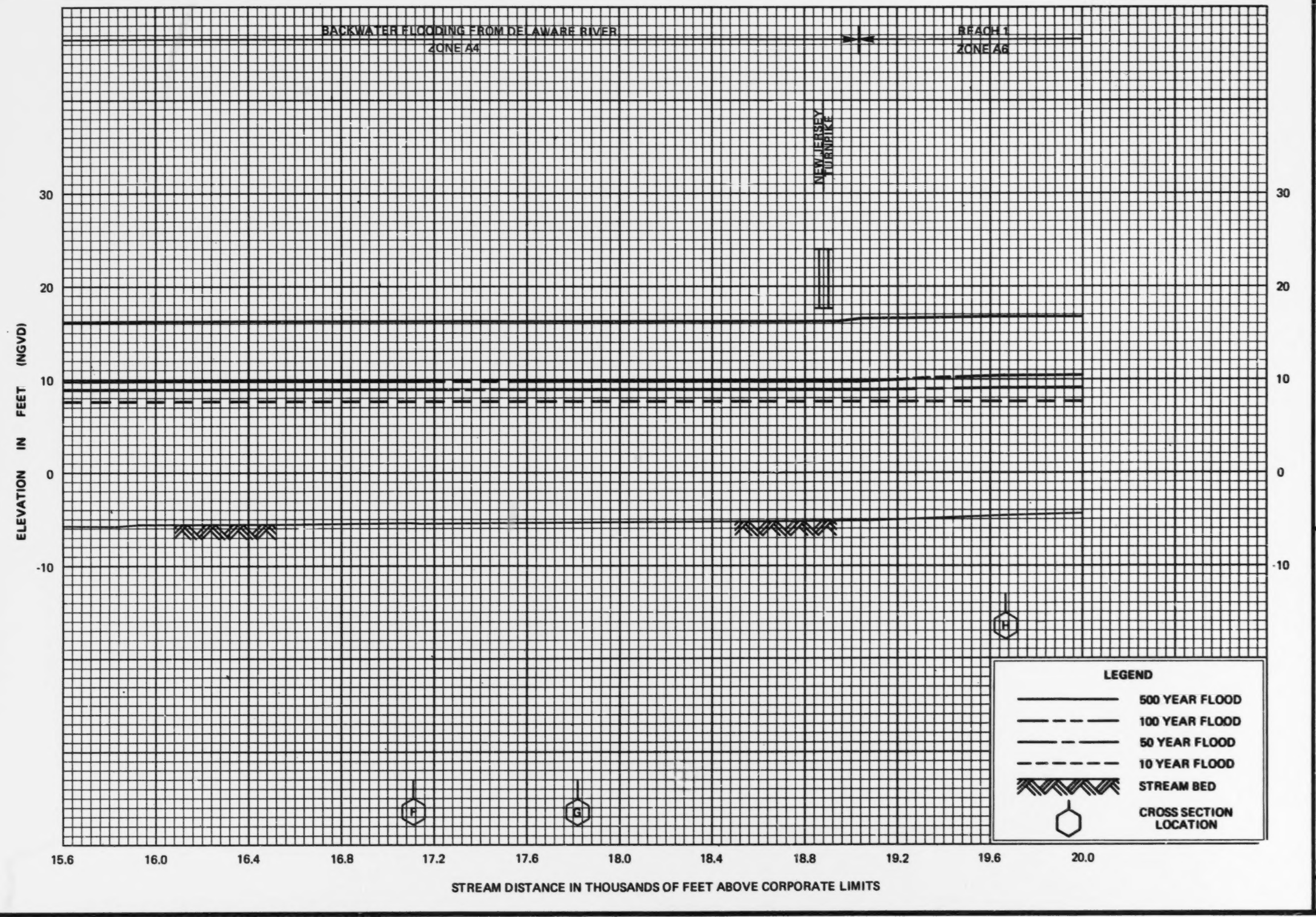

FLOOD PROFILES

MANTUA CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWNSHIP OF EAST GREENWICH, NJ
(GLOUCESTER CO.)

04P

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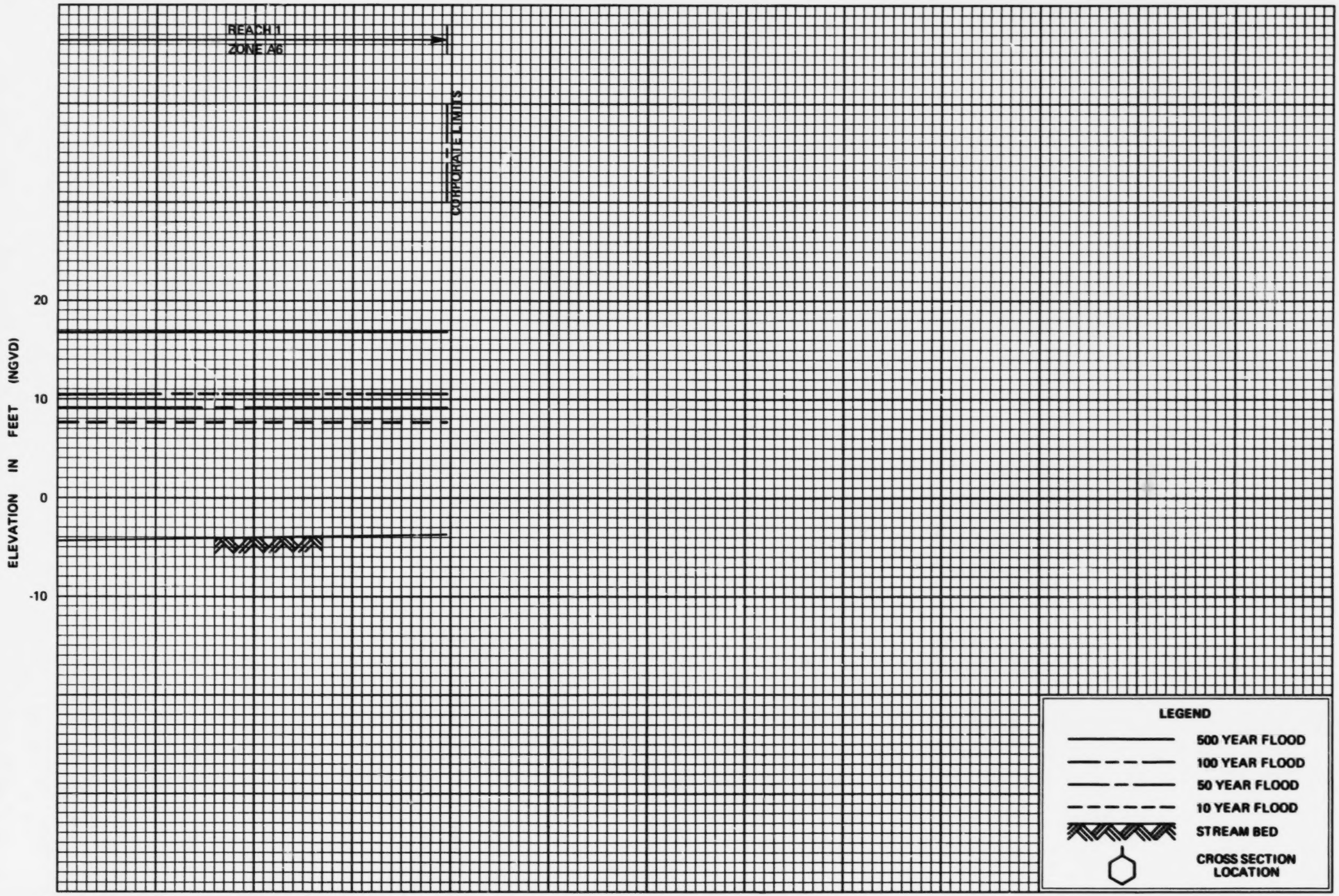

FLOOD PROFILES

MANTUA CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWNSHIP OF EAST GREENWICH, NJ
(GLOUCESTER CO.)

05P

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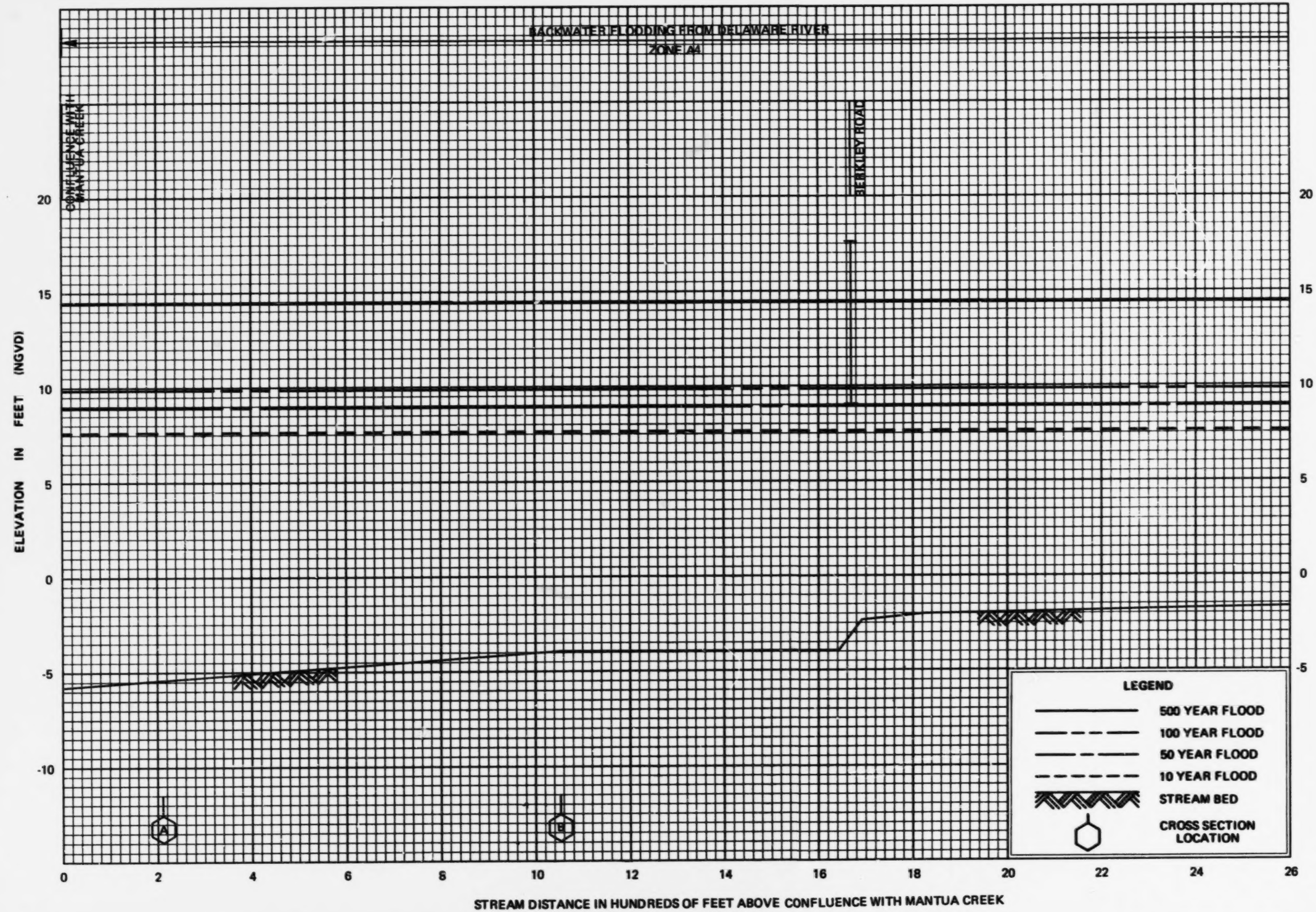

FLOOD PROFILES

EDWARDS RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWNSHIP OF EAST GREENWICH, NJ
(GLOUCESTER CO.)

06P

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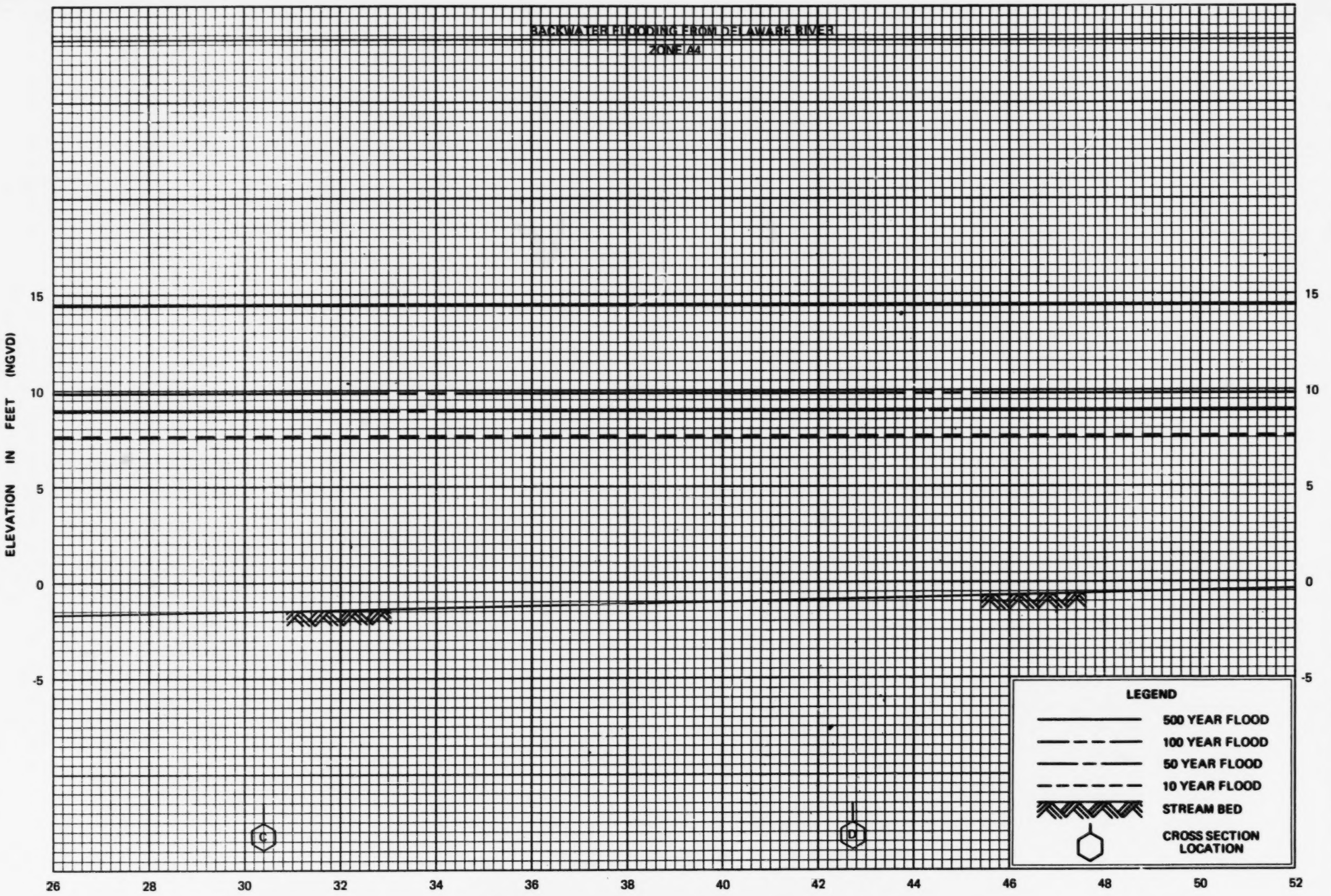
BACKWATER FLOODING FROM DELAWARE RIVER
ZONE A4



STREAM DISTANCE IN HUNDREDS OF FEET ABOVE CONFLUENCE WITH MANTUA CREEK

FLOOD PROFILES

EDWARDS RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWNSHIP OF EAST GREENWICH, NJ
(GLOUCESTER CO.)

07P

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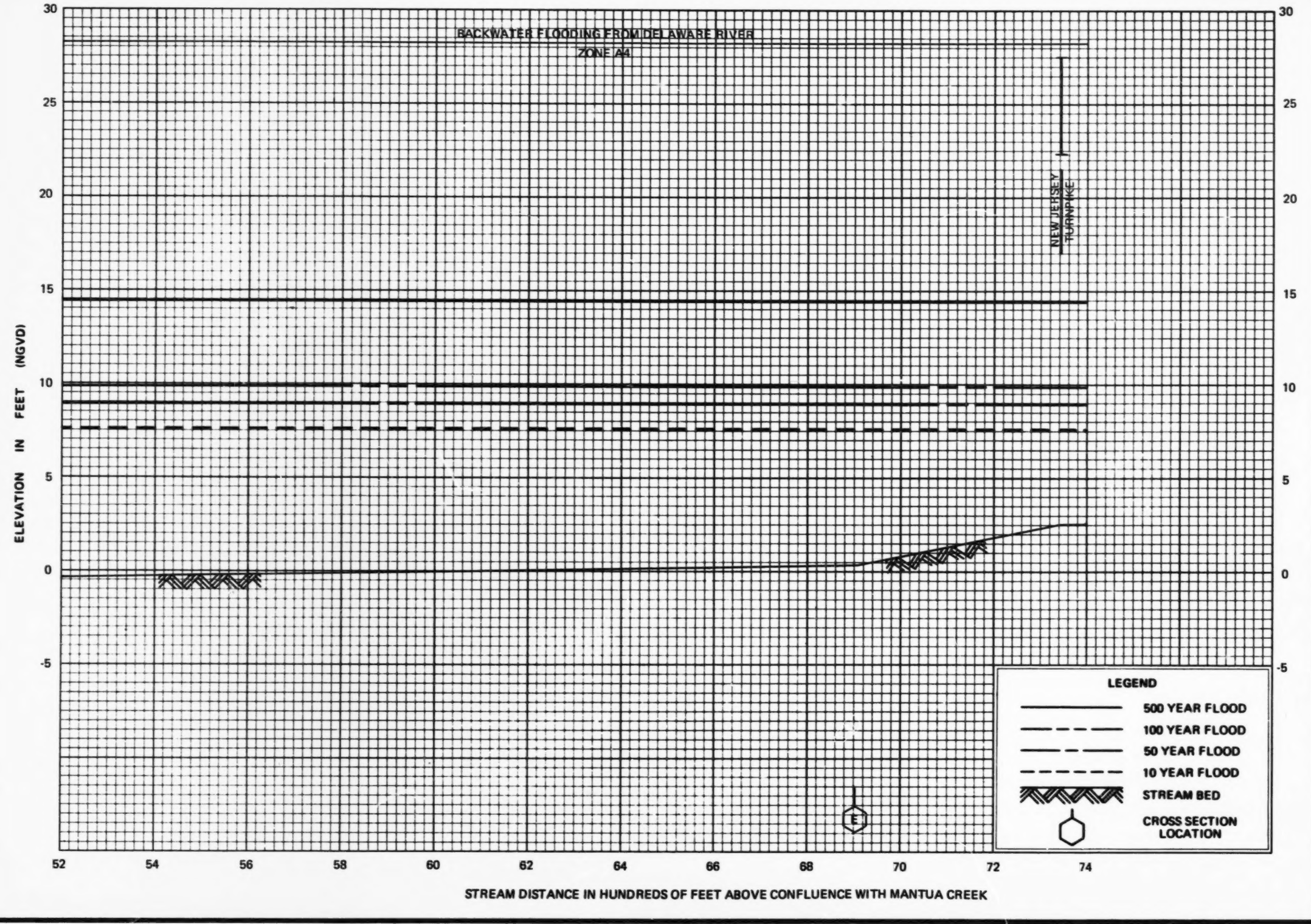

FLOOD PROFILES

EDWARDS RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWNSHIP OF EAST GREENWICH, NJ
(GLOUCESTER CO.)

08P

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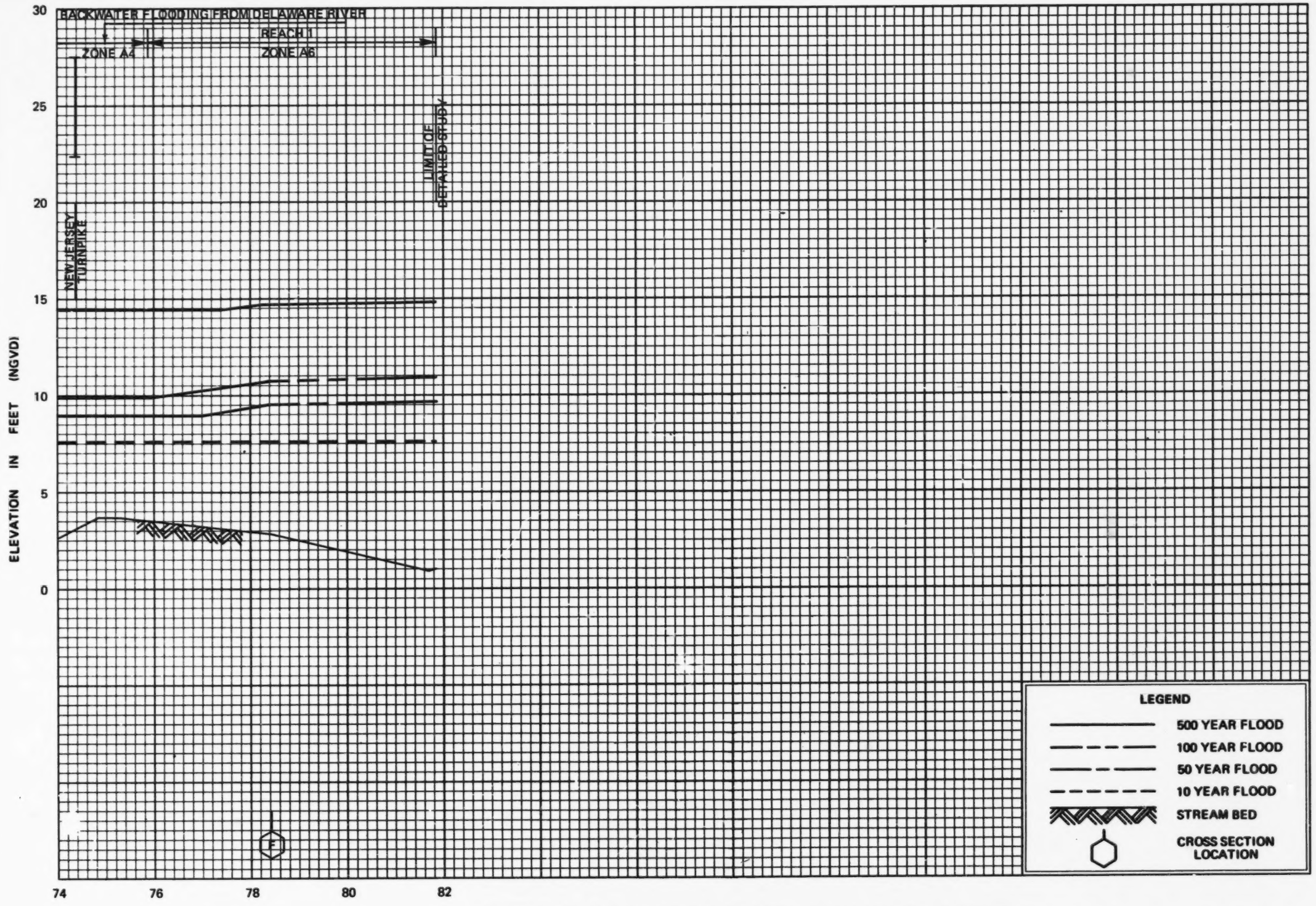

FLOOD PROFILES

EDWARDS RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWNSHIP OF EAST GREENWICH, NJ
(GLOUCESTER CO.)

09P

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